

Caudal fin convex behind.

Pectoral fins pointed.

Ventral fins subjugular, inserted obliquely, with its rays approximated, and its innermost attached to the breast by a membrane.

The lower pharyngeal bones are entirely separated, compressed and laminar, with the body emarginated below and the posterior processes directed upwards, attenuated towards their ends; with the teeth pauciserial; of the inner row slender, elongated and acute, curved outwards in front and erect behind; of the outer much smaller, but similar in form. *Upper pharyngeals* three on each side laminar, each with a row of large, slender, curved teeth.

The branchial arches have compressed, pointed rakers, progressively decreasing in length from the first to the fourth arch, on which last they are short and triangular; each armed with small, slender teeth on their internal margins.

Metoponops is readily distinguishable by the characters above given, especially the prominence of the interorbital ridge and the consequent oblique position on the forehead of the upper eye, whose line of vision is upwards; the scaly channel of the ridge itself; straight lateral line; dentition, and the form of the lower pharyngeal bones, especially the paraboloid emargination below in front. It is apparently as closely related to its cohabitant of California, *Orthopsetta*, as any other, but that genus is at once distinguished by its compressed head and little prominent, narrow interorbital ridge.

METOPONOPS COOPERI Gill.

The height of the body is contained about three times in the total length; the head about four times, and the caudal six times and a half. The longitudinal diameter of either orbit equals about a third of the head's length. The snout is rhomboid, decurved in front, and its length from the lower orbit to the symphysis equals about a fifth of the head's length. The supramaxillary ends under the front of the pupil, and from the symphysis to its end enters twice in the distance between the chin and preopercular margin. The greatest height of the dorsal equals the length of the upper jaw, as well as does that of the anal. The pectoral fin equals about a sixth of the total length.

D. 89. A. 71. P. 13.

The color is uniform brownish.

A single adult specimen of this species is in the collection formed by the Californian Geological Survey, of which Prof. Whitney is the superintendent, and was obtained by Dr. Cooper, the naturalist of the Survey, at Santa Barbara, in May, 1863. This specimen is in poor condition, having been apparently obtained only after exposure for some time to the sun; the fins have been dried, and the pectorals and ventrals are more or less broken, especially the latter, while the abdomen is much injured. I am consequently compelled to omit some desirable details. The species itself is a very interesting one, and I give myself the pleasure of dedicating it to my friend, Dr. Cooper.

On the Affinities of several doubtful BRITISH FISHES.

BY THEODORE GILL.

Among the few still uncertain species of British fishes, none are involved in greater obscurity than those presented under the name of *Ophidium imberbe* by Pennant and Montague, and those referred by Hoy to the Linnæan *Trichurus lepturus*. A detailed investigation into the literature and history of the former has enabled me to demonstrate its relations, and the discovery of a recent type in the Caribbean Sea permits me to at least suggest the affinities of the latter,* concerning which I had long been perplexed. These con-

* See Proceed. Acad. Nat. Sci. Phila., 1863, p. 228.

tributions to British Ichthyology are, with this introduction, especially submitted to the naturalists of Britain, to whom it remains to verify or disprove the validity of the conclusions arrived at. I shall only remark that the failure, after so long a period, to find any species more conformable to the notice of *Ophidium imberbe* than the one herewith identified with it, is itself most suggestive.

1. OPHIDIUM IMBERBE L., Montag.

For half a century a nominal species of fish has been retained in the catalogues of the British fishes under the name of "*Ophidium imberbe* L.," and in later times under that of "*Gymnclis imberbis*." As no critical investigation into the history of this species has yet been given, it is thought that such will not now be superfluous, since thereby a name symbolic of no distinct organism may be eliminated from the systematic and faunistic works, and the false ideas connected in recent times by means of it with the geographical distribution of two remarkable genera be dissolved.

Commencing with the general introduction of the binomial nomenclature, Linnæus, in the tenth edition of the *Systema Naturæ*,* defined anew the genus *Ophidium*,† then placed by him at the end of the Jugulares, and assigned to it five branchiostegal rays, and ventral fins with two rays, the external of which is spinous. In the genus thus defined, he respectively placed, 1. *O. barbatum*. 2. *O. imberbe*. 3. *O. macrophthalmum*. The first has articulated bifid ventral fins modified as barbels,‡ situated below the chin, and is the type of a family closely related to the Brotuloids§ and Gadoids. The third is evidently the species afterwards described as *Cepola rubescens* by Linnæus,|| as was subsequently shown by Linnæus¶ and Cuvier.** Thus, neither of these species answered to the terms of the diagnosis. The *Ophidium imberbe* was noticed in the words "O. maxillis imberbibus, cauda obtusiuscula, D. 79. P. 11. V. 2. A. 41. C. 18. Hab. in Europa." This diagnosis, in connection with the notice of the ventrals in the generic diagnosis, enables us at once to identify the species with the common *gunnell* of Europe, no other having even approximately such a radial formula. But references are made to the *O. cirris carens* of Artedi†† and the *Fauna Suecica*.‡‡ Artedi based his species in the "Synonymia" on, 1st, the *Ophidium flavum* vel *Ophidium imberbe* of Rondelet§§ and the notices of the same derived from Rondelet by Willoughby||| and Ray; and, 2d, the *Ophidium flavum* § *imberbe* of Schonevelde¶¶ and *Ophidium* of

* Syst. Nat., ed. 10, 1259.

† "Caput nudiusculum.

‡ Membr. branch. patula radiis V.

§ "Corpus ensiforme. Pinna dorsalis anique unita caudæ. Pinne ventrales radiis duobus; exteriore spinoso."—Linn., Syst. Nat., ed. 10, i. 259.

¶ I have already shown that the so-called barbels of *Ophidium barbatum* are true ventral fins on account of their articulation and attachment, and not homologues with the barbels of the Mulloids and Polymyxioids.

§ The Brotuloids form a very natural family, but its distinctive characters have hitherto been only hinted at. Among the most trenchant are the closure of the cranial cavity in front and the consequent development of a more or less complete bony septum; the compression downwards of the sides of the cranium and angularity below, and the great development of the exoccipitals, which unite and extend obliquely upwards behind the supraoccipital: the forms of the supramaxillars already described by me, and the development of a genital papilla in the males.

|| The *Cepola rubescens* must be called *Cepola macrophthalmus*. The diagnosis and radial formula "O. maxillis imberbibus, pinna caudæ acuminata.—D. 69. P. 15. V. 6. A. 62. C. 12. Hab. in M. Med.," enables one at once to identify the species.

¶ Linnæus, Syst. Nat., ed. 12. ed. Gmel., 1187.

** Cuvier et Valenciennes, Hist. Nat. des Poissons, xi. 389.

†† Artedi, Genera, 25. Syn. 42.

‡‡ Linnæus, Faun. Suec., 289.

§§ Rondeletius, lib. xiv. cap. 2, p. 398.

||| Willoughby, p. 113. Ray, Syn., p. 39.

¶¶ Schonevelde, Ichthyologia, &c.—quæ in florentissimis ducatibus Slesvici & Holsatiæ, &c., 1524, p. 53.

Schelhammer.* The first is a fish of the Mediterranean, closely resembling the *Ophidium barbatum*, according to Rondelet, but distinguished by its want of barbels and its yellow color; it has been identified by Cuvier† with his “*Donzelle imberbe*”—the *Fierasfer acus* Kaup. The second was evidently based on the *Muraenoides gunnellus* of authors, as Broussonet‡ and Cuvier§ have shown. The *Ophidium cirris carens* of the “*Synonymia*” is therefore a compound; that of the “*Genera*” is only based on the *Ophidium flavum & imberbe* Auctorum,” (Schonevelde,) and said to inhabit the Baltic Sea; it is thus primarily the *Muraenoides gunnellus*. Artedi was apparently not acquainted through autopsy with any of his Ophidia.

The Ophidion of the Fauna Suecica, placed among the *Jugulares*, is also, without doubt, the *Muraenoides gunnellus*, of which Linnæus had not then mentioned the ventral fins. The formula of the fins in the tenth edition of the *Systema* is similar, but with the addition of the rays of the ventrals.

Subsequently, Gronovius, in the *Zoophylacium*,|| connected this name with a fish which appears to be nothing more than an *Ophidium barbatum*, of which the barbels had been destroyed, as Cuvier¶ suggests, or concealed within the limbs of the lower jaw and overlooked, as may readily be the case. We might have hoped to have had this question solved by Dr. Günther, as, according to Dr. Gray,** the Gronovian fish was in the collection purchased for the British Museum; Dr. Günther has, however, not referred to the specimen in his Catalogue.

Pennant†† next affixed the same name to a fish found near Weymouth, and communicated to him by the Duchess of Portland, giving a figure of it in the fourth volume of his *British Zoology*, but no description. This fish is apparently a common eel, as Broussonet‡‡ and Cuvier§§ have suggested; probably Pennant and his friends were deceived by some anomalous appearance of the fish itself, as it appears to have been shorter than usual. There is, at least, nothing but the eel found in European or, indeed, any other waters, which at all resembles the fish figured by Pennant.||||

In a subsequent edition of the *British Zoology*, this figure was replaced by one in the meanwhile published by Montague under the name of *Ophidium imberbe*.

Such is the essential history of the applications of the name of *Ophidium imberbe* down to the year 1777. The age of compilers, commencing with Haüy and culminating in Lacépède, Bloch, Schneider and Shaw, soon after commenced. These authors variously combined the notices of their predecessors, and finally succeeded in involving a species, concerning which there was no reasonable room for doubt, in such mystery that almost all memory of the original type was eventually lost.

Haüy, in 1788, in the *Encyclopédie Méthodique*,¶¶ adopted in his descrip-

* Schelhammer, De Anatome Xiphie piscis uti Lumpi et Ophidii, p. 23.

† Cuvier, Mém. du Muséum, i. 1815, pp. 312, 313.

‡ Broussonet, Phil. Trans., London, lxxi 1781, p. 438.

§ Cuvier, op. cit., i. pp. 315, 316.

|| Gronovius, Zoophylacium, 1763, No. 401.

¶ Cuvier, Mém. du Muséum, i. 1815, p. 316.

**Catalogue of Fish Collected and Described by Lawrence Theodore Gronovius, now in the British Museum, London, 1854. (*Ophidium congrus*, B. M., p. 164.)

†† Pennant, *British Zool.*, iv. 1, App., 398, iv. pl. 93.

‡‡ Broussonet, Phil. Trans., lxxi. 1781, p. 429, note.

§§ Cuvier, Mém. du Mus., i. 1815, p. 316.

||| Mr. Templ ton, in 1837, announced that “the only specimen (of *O. imberbe*) I have observed, was thrown on the shores of Belfast Lough, near the White Horse Point, on January 9, 1809. It was a large specimen, not less than a foot long, and agreed so exactly with the figure in the *British Zoology*, and differed so much from that of Mr. Montague (Wern. Mém., p. 95, pl. 4), that I am led to believe there are two distinct species, of which Pennant has described one and Montague the other.”—*Mag. Nat. Hist.*, N. S., i. 412. Mr. Thompson (N. H. Ireland, iv. 1856, p. 233), was unable to gain further information. If the specimen was not a thick eel, it may have been a *Zoarces viviparus*.

¶¶ Encyc. Meth. Hist. Nat., iii. Poissons, p. 212.

tion of the "*Imberbe*,"—*Ophidion imberbe*,—the colors as well as very low dorsal fin from Rondelet, but at the same time described the dorsal with Schonevelde as a very stiff, rigid one—still considering it a *Malacopterygian*! Also stating that, according to Gronovius, there were 147 dorsal rays and 101 anal, among which the caudal were included, he recalled that Linnæus distinguishes the three fins, assigning to the dorsal 79 rays, to the anal 41 and to the caudal 18, and the combination of these, according to our author, forms 238 (sic!) rays, 10 less than that which results from the enumeration of Gronovius! He concludes by giving with Gronovius quite large, lauceolate pectorals with 26 rays; and, finally, with remarks on its habitat from Rondelet. The description is thus based only on three species belonging certainly to as many very distinct families; but, in his synonymy, he includes references to the *Sea snail* of Petiver* and the *Congrus* of Aldrovandi,† the one representing a *Liparis*, and the other a true *Conger*, representatives of two more families. It must, however, be added, somewhat in extenuation for Haüy, that the last two, singularly enough, originated with Gronovius, perhaps the most sagacious and learned ichthyologist of the past century.

Bonnaterre,‡ engaged on the same great work, followed Haüy, and concluded his notice with the radial formula B. 7. D. 238. P. 26. V. 0. A. 0. C. 0., which is evidently the result for the dorsal of the sum so singularly obtained by Haüy from the combination of the numbers attributed by Linnæus to the dorsal, anal and caudal fins, while the numbers of the pectoral and branchiostegal rays are derived from Gronovius; the negation of the anal and caudal fins is peculiar to the author himself.

Gmelin§ included in the synonymy of the Linnæan species the references to the *Ophidion* of Gronovius,—placing the radial formula of the latter immediately under that of Linnæus,—as if to draw attention to the remarkable difference between the two which he could not himself appreciate,—and also referred to Pennant's figure.

Walbaum,|| in his edition of the "Genera of Artedi," simply added the notices from the *Fauna Succica* and Schonevelde, as well as a reference to the figure of Pennant, with the opinion of Broussonet concerning the same.

Lacépède¶ obtained from Linnæus, for his notice, the rounded caudal fin and radial formula, and from Rondelet the yellow color and its Mediterranean habitat, while his information regarding the delicacy of its flesh in common with that of the *O. barbatum* is original, and serves well to open a paragraph.

Shaw** copied his notice from Gronovius.

Bloch, or his editor, Schneider, gave to the species the name *Ophidium "Chinense"*! at the same time depending *entirely* on the *Fauna Suecica* of Linnæus for information relative to its habitat,—("Habit ut in mari baltico et oceano, reperitur saepe intra ostrearum testas"); and, while also deriving his knowledge of its characters for his text from the same source, copied Pennant's figure as illustrative at once of the species and the genus.††

Cuvier arising, dispelled the obscurity which involved the history of so many of the most common European Fishes in his remarkable series of *Memoirs on the Fishes of the Mediterranean*. In that on the *Ophidium imberbe*, (De la Donzelle imberbe,) he demonstrated that the *Ophidium imberbe* of Rondelet, and his copyist Willoughby, was distinct from that of Schonevelde, Schelhammer and Linnæus; that the first was related to *Ophidium barbatum*, and the second identical or very closely allied with the *Blennius gunnellus* of Linnæus; that the *O. imberbe* of Gronovius was a true *Ophidium* deprived of

* Petiver, *Gazophylacium*, tab. 51, fig. 3.

† Aldrovandi, *Pisc.*, lib. iii. cap. 25, fig. p. 349.

‡ Bonnaterre, *Tab. Encyc. et Meth., Ichthy.*, 1788, p. 41.

§ Linnæus, *Syst. Nat.*, Gmelin's ed., 1788, p. 1147.

|| Artedi, *Gen. Pisc.*, Walbaum's ed., 1792, p. 157.

¶ Lacépède, *Hist. Nat.*, ii. 1800, p. 279.

** Shaw, *Gen. Zool.*, iv. 1803, p. 70.

†† Bloch, *Syst. Ichth.*, Schneider's ed. p. 456.

barbels, and that Pennant's fish was an eel.* He was unable to determine a fish noticed by Montague under the same name. While therefore the *Ophidium imberbe* was eliminated from the Catalogues of Fishes of Continental Europe as a distinct species, it still held a position among those of England. To the consideration of this English fish we now proceed.

In 1811, in the Memoirs of the Wernerian Society, Montague† described and figured the fish identified by him with the *Ophidium imberbe*. It was "taken on the south coast of Devon," and in "length was about three inches;" the body "ensiform;" "the dorsal fin commences immediately above the base of the pectoral, and is at first not so broad, and usually not so erect as the other part," and the caudal is cuneiform and obtusely pointed. "The color is purplish-brown, disposed in minute speckles; and along the base of the anal fin are about ten small bluish-white spots regularly placed, but scarcely discernible without a lens, possibly peculiar to younger fishes." The rays were respectively—pectoral 11; dorsal about 74; anal 44; caudal 18 or 20. Such was the first detailed account of *Ophidium imberbe*, based on a British fish, and such the authority on which the subsequent British faunists have preserved the species in their catalogues. By Turton,‡ Fleming,§ Jenyns,|| Yarrell,¶ Gray,** &c., it has been retained in the genus *Ophidium* (§ *Fierasfer*), while more recently, Kaup,†† Richardson‡‡ and Günther§§ have transferred it to the genus *Gymnelis*; the first originally under the name of *Cepolophis*.||| It remains to examine into the grounds for such approximations.

It is not probable that a fish whose dorsal arrested the attention of Montague on account of its being so "erect," could have been a Malacopterygian, and this character as well as the distinctness of all the rays, the development of the caudal, whose rays are longer than those of the dorsal and anal, the relations of the various parts, and even the gill-membranes inflated beneath, render it evident that the fish in question could have been in no wise related to either *Ophidium*, *Fierasfer*¹ or *Gymnelis*,² all of which are *Malacopterygians*, with caudal rays shortest and not developed as a distinct fin. Its affinities are then to be sought for in another direction. The general form, the "erect" dorsal fin and the number of rays, agree with *Muraenoides gunnellus*. The color is in that species sometimes simply "purplish-brown," the dorsal spots becoming obsolete, and, in a single specimen from England in the Smithsonian collection, several anal spots are barely discernible.³ The failure to observe the ventrals was shared with Schonevelde, Schelhammer, Linnæus, &c., and we are more prepared for their non-observance by Montague when we

* Cuvier, Mem. du Muséum, i. 1815, 312—324.

† Montague, Mem. Wern. Soc., i. 1811, p. 95, pl. 4. fig. 2.

‡ Turton, Brit. Faun., 1807, p. 88.

§ Fleming, Brit. An., 1828, p. 201.

|| Jenyns, Man., 1835, p. 281.

¶ Yarrell, Br. Fishes, ii. 1841, p. 412.

** Gray and White, List Br. An. B. M., Fishes, 1851, p. 51.

†† Kaup, Cat. Ap. Fishes, 1856, p. 156.

‡‡ Yarrell, Br. Fishes, Richardson's ed., i. p. 79 (*vide* Günther.)

§§ Günther, Cat. Fishes, iv. 1862, p. 325.

||| Kaup, Arch. für Nat., 1856, i. p. 97.

¹ *Fierasfer* Cuv., is the type of a peculiar family related to the Opidioids, but with the anus thoracic or jugular, the body much attenuated backwards, and the anal fin longer and higher than the dorsal; it embraces four genera,—*Fierasfer* Cuv., or *Carapus* Raf. (not Cuv.), *Encheliophis* J. Muell.,—*Echiodon* Thompson,—the latter of which is the only British type, and *Helminthodes* Gill, (type *Oxybeles lumbricoides* Blkr.) distinguished by its very slender form.

² *Gymnelis* Reinb., is the representative of a peculiar family (*Lycooidæ*), allied to the Brotuloids, but with the branchial apertures more or less restricted, the ventrals rudimentary or obsolete, the skull oblique behind, the supraoccipital bone being deflected downwards, wedged between the exoccipitals, and with its point and low crest continued almost or quite to the foramen magnum; the cranial cavity is open in front, no osseous septum being developed. This family is only represented by the genus *Echelyoptus* or *Zoarces* in the European seas, which, as J. Müller (Arch. für Nat., 1843, i. 294) has shown, is truly Malacopterygian.

³ These light spots are accidental, none being developed in other specimens from England, Denmark and the German Ocean.

remember his peculiar views concerning the ventral fins.* Objections may be urged against this identification, that Montague would have recognized the *Muraenoides gunnellus*; that the proportions represented in his figure are not precisely equivalent to those of that species, and that the critical Cuvier and all succeeding naturalists have failed to notice the identity. I shall only recall the admission that Linnæus himself, after autopsy, referred one specimen of the same species to *Blennius (gunnellus)* and another to *Ophidion (imberbe)*; that Montague wrote, in the year 1812, and in the infancy of ichthyology, when the importance of attention to minutæ was less generally appreciated than now, and that the identification of his fish with *Muraenoides gunnellus* was probably stayed by the improbability of his failure to recognize that common species.

As Dr. Günther, in the synonymy of "*Gymnelis imberbis*,"† has represented the ideas of the English naturalists; and, as his work is the last authority referring to it, an analysis and reduction of that synonymy to its proper elements will form a fitting conclusion to these remarks.

1. MURÆNOIDES‡ GUNNELLUS ex L.

Ophidium imberbe L.; Montag.; Turton, 88; Fleming, 201; Jenyns, 481; Yarrell, ed. 1, ii.; ed. 2, ii. 412.

Cepolophis Montagui Kaup.

Gymnelis imberbis Kaup, Ap. Rich. in Yarrell, ed. 3 (fide Gthr.)

2. CARAPUS‡ ACUS Raf. ex Brun.

Ophidium imberbe Lac., pt. (Radial formula and caudal fin of *Muraenoides gunnellus*.)

3. MURÆNA|| ANGUILLA L. or allied sp.

"Beardless *Ophidium Pennant*," Brit. Zool., iii. 398. App., tab. 93.

* The reference by Dr. Shaw of *Vandellius lusitanicus* (= *Lepidopus caudatus*) to the thoracic order, "caused the obscurity of *Vandellius lusitanicus*, as no one could have expected to have found an Apodal fish placed in that division. How that naturalist could have fallen into such an error, I cannot conceive, unless he considered the pair of ventral scales as rudiments of those fins, or what is commonly attached to the base of the ventral fins of some fishes, as may be observed in many Spari?" "I am aware that it has been contended that these abdominal scales are lamellated ventral fins. If so, we have yet to learn the definition of a fin in the modern revolution of science. Those who contend for the continuance of *Vandellius* of Shaw or for the *Lepidope* of Risso being continued in the Thoracic order, must also constitute a new order for many fishes that have such lamellated appendages, independent of two ventral fins. But I cannot admit of a simple corneous scale, destitute of motion, being a ventral fin."—MONTAGUE, in *Mem. Wern. Soc.*, ii. 1818, pp. 432, 433.

† Dr. Günther remarks, that the *Gymnelis stigma* and *G. imberbis* "probably do not belong to this genus."

Gymnelis stigma—*Ophidium stigma* Lay and Benn. (sic)—is probably congeneric with and perhaps even closely related to *G. viridis*; and it at least greatly resembles some varieties of that variable species. The poor figure and the assignment of "very small" scales to it led me, on a former occasion, to think otherwise, like Dr. Günther; but we must remember that the notes and illustrations of *Ophidium stigma* were made by an inexperienced naturalist, and that he may have been deceived as to the presence of scales. However, we may also recall that there is a great variation in squamation in a genus representing a closely related subfamily,—(*Lycodes*.)

‡ The question will naturally arise among those who contend that we should date our nomenclature from the tenth edition of the *Systema Naturæ*—that being the first in which the binomial system is introduced—whether we should not replace the name *Muraenoides*, *Centronotus*, or *Gunnellus* by *Ophidion*. Perhaps this will eventually be done, since the genus was well defined and its diagnosis only applicable to the *O. imberbe*. Others may contend that the name must be retained for the first species—(*O. barbatum*)—in spite of its total disagreement. The decision of this question may be suspended till the publication of the new rules of the British Association.

§ The name *Carapus* was first connected with the *Gymnotus acus* by Rafinesque (Ind., 1819, p. 37, 57), who only referred to that species, although he doubtless intended his genus to correspond with Lacépède's anonymous second subgenus of *Gymnotus*, which included the *Gymnotus carapus* L., *G. acus* L. (= *Fierasfer acus* Kaup) and *G. rostratus* L. (= *Rhamphichthys rostratus* M., T.) A strict adherence to the laws will, however, necessitate the retention of the name for the only species mentioned—(*C. acus*.)

|| Bleeker is doubtless correct in retaining the name *Muraena* for the *M. anguilla*. The name was restricted to the type represented by that species by Bloch, who first subdivided the genus, and the *M. anguilla* was evidently the one on which Artedi and Linnæus based their diagnoses.

2. "TRICHIURUS LEPTURUS."

The question which we shall next consider relates to the specimens identified by Mr. James Hoy* with the *Trichiurus lepturus* of Linnæus.

In the Transactions of the Linnæan Society, Mr. Hoy has published an account of two fishes stranded at considerable intervals of time "upon the shore of the Moray Frith, near the fishing village of Port Gordon." The first specimen was found "on the 2d of November, 1810, after a high wind from the north;" "its head was much broken;" "the extremity of the upper jaw, or upper part of the mouth, was entire; upon either side of which was an operculum;" "the body, from the gills to the point of the tail, was three feet two inches long; its greatest breadth six inches and a quarter, and its greatest thickness only an inch;" "both sides of the fish were wholly white, without a spot upon them;" "the dorsal fin was the only part of a different color, being a blackish-green; this ran all the way back from the gills to the tail;" "the tail ended in a point, consisting of three or four soft spines or bristles of different lengths, not exceeding two inches. The body was nearly of the same breadth for one half of its length, and then its breadth diminished gradually till within three inches of the tail, when the diminution became more quick. The lateral line was straight, and strongly marked along the middle of the two sides."

The second specimen was obtained "on the 12th of November, 1812;" "its head had been broken off and was quite gone; a small bit of the gills only remained about the upper part of the throat, from whence to the extremity of the tail its length was twelve feet nine inches; its breadth, eleven inches and a quarter, was nearly equal for the first six feet in length from the gills, diminishing gradually from thence to the tail, which ended in a blunt point, without any of those kind of bristles which projected from the tail of the one found formerly; its greatest thickness was two inches and a half; the distance from the gills to the anus forty-six inches. The dorsal fin extended from the head to the tail," &c. "There were no ventral nor anal fins; but the thin edge of the belly was closely mucicated with small hard points, which, although scarcely visible through the skin, were very plainly felt all along it. Both sides of the fish were white, with four longitudinal bars of a darker color; the one immediately below the dorsal fin was about two inches broad, each of the other three about three-fourths of an inch. The side line straight along the middle."

On the authority of these specimens, the *Trichiurus lepturus* was admitted by the British Faunists in the Catalogues of their fishes.

Dr. Fleming† considered that the two specimens belonged to different species. "The differences in the position of the vent, the structure of the tail, and the condition of the edge of the belly, seem too great to justify the inference of their being only varieties. The latter fish appears identical with the *Lepturus* of Ardeï, and consequently of Linnæus."

Subsequently, Dr. Fleming‡ considered that "the position assigned to the vent, the absence of ventral fins, and the white color of the sides, (of Hoy's first specimen) all accord with the Deal-fish, (*Trachypterus*.) The color of the dorsal fin, however, which was of blackish-green, seems to oppose this view, though the dead state of the fish may probably serve to explain this difference, if duly considered."

Repugnant as must be such perversions of names, consideration for the uniformity of nomenclature, which may best be attained by strict adherence to the laws, seems to require assent to them. The genus *Anguilla* is generally attributed to Thunberg, but a search instituted among his various memoirs has failed to reveal any mention of it, and it is to be remarked, that no naturalist has referred to any precise work. Prof. Agassiz, indeed, refers to "*Anguilla Thunb.* Nuov. Mem. Stock., 179—," but no such generic name is to be found in the series referred to under that title.

* Hoy Trans. Linn. Soc. xi, p. 210.

† Fleming, Br. An., 1828 p. 204.

‡ Fleming, Loudon's Mag. N. H. iv., 1831, p. 219.

Mr. Jenyns* was inclined to adopt Dr. Fleming's opinion—"that the first specimen of Hoy was a distinct species, if not belonging to a different genus. There can be no doubt that the one described above (Hoy's second specimen) was a true *Trichiurus*, and probably *T. Lepturus* of Linnæus and other authors; but as the description is rather imperfect, and the species of this genus ill determined, it is impossible to speak with certainty on this last point."

Yarrell† especially alluded to the median lateral line and lateral bands, and remarked that "it is evident that more information on the subject is required; the result of it may be the establishment of Mr. Hoy's second fish as a new species of *Trichiurus*, and of his first fish, which is evidently distinct from the second, as the type of a new genus, if, as Dr. Fleming has suggested, it was not a mutilated example of the Deal-fish of the Arcadians, *Gymnetrus arcticus*."

With enlarged opportunities for arriving at a possible decision concerning at least the second specimen, I proceed to institute inquiries into the nature of these materials. The form and approximately the proportions noticed by Hoy, the "operculum on each side" of the mouth, simulated by the supra-maxillars, the soft dorsal rays, the bristles at the end of the tail, the strongly marked straight lateral line appear to indicate, as Fleming has suggested, that Hoy had before him, in his first specimen, a much injured example of *Trachypterus* with most of its fins destroyed, and it is probable that a hole, caused by the caducous ventral fins, might have been mistaken for the anus;‡ this may seem very remarkable, but it is evident that Mr. Hoy has not the slightest claim to scientific consideration, and the hole so created in *Trachypterus* would correspond in space to the "anus" discovered by that gentleman. A thoracic anus is incompatible with the structure of the Trachypteroids or any related forms. The "blackish-green" color of the portion of the dorsal remaining might have been due to discoloration, and we need not be much astonished that the lateral dorsal spots were overlooked in such a specimen.

The second specimen of Hoy evidently belonged to an entirely different type. The form and "closely mureted" belly indicate that it was related to the family of Lepturoids or Trichiuroids, but the "blunt point" in which the tail terminates, as well as the median lateral line, forbid us, on morphological grounds alone, from referring it to *Trichiurus lepturus*. It might have been supposed to have been a specimen of *Lepidopus caudatus*, were it not for the color, but that, sustained by the superior height, forbids us to refer it to that species. What then can it have been?

In the summer of 1863, I received from the learned Cuban naturalist, Prof. Poey, of the University of Havana, a fish, concerning whose systematic position he was unable to satisfy himself. This fish was found to resemble *Lepidopus caudatus* in all essential characters except the remarkable form of the head, which was exceedingly compressed, trenchant and obliquely de-curved above, with the forehead elevated above the eyes, and the chin obtuse. Notwithstanding such characters, its affinity to *Lepidopus* was evidently so great, the form, structure of the fins, especially the anomalous form of the pectorals, and the development of the opercular bones coinciding, that I felt compelled to retain it in the same subfamily, in contradistinction to one containing *Trichiurus* (= *Lepturus* Art.) and *Eupleurogrammus*.§ The color

* Jenyns, Manual 1835, p. 372.

† Yarrell, Br. Fishes, i, 1841, p. 204 (207).

‡ This same mistake, indeed, was made in the communication by Dr. Duguid to Dr. Fleming, concerning the same fish, (see London's Mag. iv., 1831, pp. 215, 216,) and Dr. Fleming, himself, so far from correcting the error, alluded to the similarity of the so-called vent as evidence of the pertinence of Hoy's fish to the same species, (op. cit. iv., 219). By a somewhat singular coincidence, the same error in identification of the *Trachypterus* with the *Trichiurus lepturus* was made by Olfesen (Voyage to Iceland, p. 592.)

§ Gill, "Synopsis of the Family of Lepturoids, and Description of a Remarkable New Generic Type," in Proc. Ac. Nat. Sc. Philadelphia, 1863, p. 224. &c. In this article I have suggested the relation of Hoy's fish and *Evoxymetopon tenuatus*.

arrested my attention, there being six or seven narrow bands, the lateral line running through the fourth; the interval between the two dorsal bands was more indistinct, and the two could readily be confounded; the width of the two would equal about a sixth of the height, while the width of the single ones was contained about fifteen or sixteen times in the height. The two lower bands were more indistinct. I was therefore at once reminded of the *Trichiurus lepturus* of Hoy, and the similar development of the bars, as well as the approximation in proportions, compel me to believe that the second specimen of Hoy is in reality a species of the genus *Evozymetopon*, if not indeed identical with the Cuban fish itself, (*Evozymetopon tenuiatus* Poey.) The greatest height of the latter, at the scapular region, is contained scarcely more than twelve times (12 1-5th) in the extreme length, while a short distance behind, and for a considerable distance, it is contained from thirteen and a half to fourteen times. The head enters eight times and a half, and the caudal, at its longest rays, twenty-nine times and a half in the same. The anus is midway between the snout and root of caudal. In this last respect it disagrees with the specimen signalized by Hoy, according to whom the anus was very considerably within the limits of the first third of the length ($46 : 153 + \chi$). Such a position is extremely improbable in a representative of the subfamily of Lepidopodinæ, to which the specimen doubtless belongs. The true anus, on account of its small size, was probably overlooked, and a rupture of the skin mistaken for it. May we not hope that some British naturalist will soon release us from our doubts, and verify the systematic position of Hoy's fish?

POLYPROSOPUS Couch.

Having provisionally adopted the generic name *Polyprosopus*, proposed by Couch, in the "Analytical Synopsis of the Order of Squali," remarking at the same time that the genus was "not yet well established," it seems advisable now to express my conviction that it belongs to the genus *Cetorhinus* or *Selache*, and that the differences observed are probably due to distortion or defective observation. I have already stated that "the absence of caudal carinæ or spiracles is quite improbable," and certainly no scientist could believe in the absence of the anal fin in such a type.

I may finally be permitted to add, in anticipation of a more extended memoir, remarks on the Lemniscates of Richardson, and more especially the *Leptocephalus Morrisii* Gm. The recent exposition of the character of such fishes, by Professor V. Carus,* will excuse this anticipation. I am happy to be able to express my unqualified belief in the conclusion as to their being simply larval forms, which that learned naturalist has enunciated. As long as the known hyaline fishes conformed to a single type, naturalists might be excused for regarding them as fully developed forms, but the doubt this group was first subjected to by the failure of Kölliker† to find organs of generation was increased by the addition by Kaup of the genus *Esunculus*,‡ and subsequently of *Stomiasunculus*.§ Carus was therefore, I think, fully justified in his "conclusion that all these fishes are nothing but larval forms of others," but he was not so happy in looking for the adults "among the Ophidians, or other compressed forms, (*Cepola*, and so on.)" I am almost certain that the typical *Leptocephali*, at least, are the young of *Congers*, and that *Leptocephalus Morrisii* is the young of *Conger vulgaris*. I am aware, indeed, that Yarrell|| has discovered that small congers, "about the size (length?) of a man's

* Carus "on the Leptocephalidæ," in Rep. Br. Ass. 1861, p. 125.

† Kolliker, Zeitschrift für Wiss. Zool. iv., p. 360.

‡ Kaup, Apodal Fishes, 1856, p. 143, fig. 3.

§ Kaup, An. Mag. N. H. (3) 1860, p. 270.

|| Yarrell, Br. Fishes ii., 1841, p. 404.

finger, are found among the rocks, close to land, during the summer." But he immediately afterwards adds that, "the small eels which ascend the Severn in such numbers in the spring, and were considered by Willoughby and Pennant as the young of the Couger, are in reality the young of fresh-water eels." May we not go a step farther and ask that it may be demonstrated that those "found among rocks, close to land," are Congers, and not eels, which have not yet commenced to ascend the rivers?

The *Hyopropus Messinensis** appears, likewise, to be merely the larval form of the Congroid *Nettastoma melanura*.† The resemblance between those two forms will be readily appreciated, by reference to Dr. Kaup's figures of the two. Perhaps the affinities of those Leptocephali with an expanded caudal, are to be sought for elsewhere. As to *Esunculus costai*, it resembles the young of a Clupeoid, but the high insertion of the pectoral fins, if existent in nature, forbids for the present its positive identification with such. *Stomiasunculus* resembles, in general features, a less advanced larval Clupeoid, about three days old.‡ in which the ventral fins have not yet appeared. Suspicion, however, may be entertained that it may, perhaps, be the young of some other type, (possibly Stomiadoids) on account of the backward position of the dorsal fin. I have myself, in company with a friend, seen the young of Clupeoids, which would have either been referred to *Esunculus*, or considered as the type of a closely allied new one, on account of the inferior insertion of the pectoral fins, and so transparent were they, that their eyes alone indicated their position in the water. Although entertaining no doubts concerning the larval nature of *Esunculus* and *Stomiasunculus*, I only venture to suggest the possible relations with much reserve. As to *Porobronchus*, Kaup.,§ it is, perhaps, related to *Fierasfer*, but the character of the first elongated dorsal ray requires to be known, before a decision can be arrived at.

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Note on the family of STICHÆOIDS.

BY THEODORE GILL.

There have been referred to the family of Blennioids a number of more or less elongated fishes, somewhat recalling to mind the *Gunnells*, but with the body more tapering backwards and covered with scales; the head comparatively elongated and produced towards the snout; the skull depressed behind the eyes; the branchial apertures produced forwards; the dorsal fin composed of spines; and the stomach cæcal, and also distinguished by the development of cæca around the pylorus. This combination of characters seems to indicate the necessity of the separation of the fishes so distinguished from the family of Blennioids, one of the principal characters assigned to which, by authors of even the most recent date, has been the want of cæca. The named genera known are *Leptoblennius* Gill, *Lumpenus* Reinh., *Leptoclinus* Gill, *Stichæus* Reinh., and *Chirolophis* Sw. (*Carelophus* Kr. = Blenniops Nilss.) For this assemblage the name Stichæoidæ may be appropriated.

Nearly related to this family is that of Cryptacanthoidæ, proposed in the "Catalogue of the Fishes of the Eastern Coast." As there is, however, considerable difference in the form and development of the head, and the ventrals are likewise obsolete, it would scarcely be advisable to combine them and the Stichæoidæ in one family. There are five pyloric appendages in *Cryptacanthodes*. The genus has none of the peculiar characters of the

* Kolliker Verh d. Phys. Med. Gesellsch in Wurzburg; iv., p. 101.

† Raf. Caratteri, &c., 1810, p. 66, tav. 16, f. 1.

‡ See Sundeval "Om Fiskyngels Utveckling" in Kongl. Vet. Akad. Handl. i., 1856, tab. iv., fig. 6.

§ Kaup. An. Mag. N. H. (3) vi., 1860, p. 272.